

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
18 March 2004 (18.03.2004)

PCT

(10) International Publication Number
WO 2004/023447 A1

- (51) International Patent Classification⁷: **G09G 3/34**
- (21) International Application Number:
PCT/IB2003/003469
- (22) International Filing Date: 4 August 2003 (04.08.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
02078678.6 6 September 2002 (06.09.2002) EP
- (71) Applicant (for all designated States except US): **KONINKLIJKE PHILIPS ELECTRONICS N.V.** [NL/NL]; Groenewoudseweg 1, NL-5621 BA Eindhoven (NL).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **JOHNSON, Mark, T.** [GB/NL]; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL). **HENZEN, Alexander, V.** [NL/NL]; Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).
- (74) Agent: **DEGUELLE, Wilhelmus, H., G.**; Philips Intellectual Property & Standards, Prof. Holstlaan 6, NL-5656 AA Eindhoven (NL).

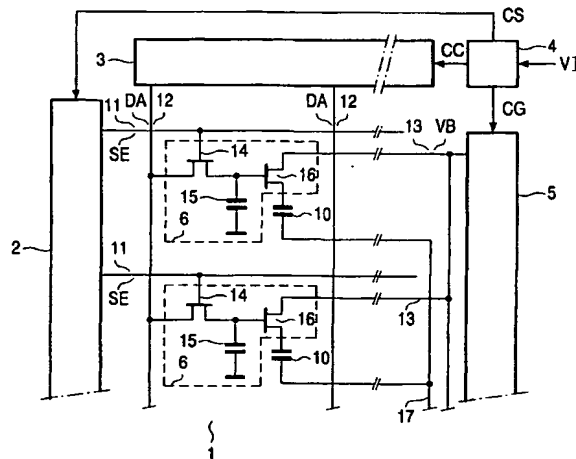
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declaration under Rule 4.17:

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH,

[Continued on next page]

(54) Title: DRIVING AN ACTIVE MATRIX DISPLAY



(57) Abstract: The active matrix display comprises a matrix of display pixels (10) which are associated with intersections of crossing select electrodes (11) and control electrodes (12). A select driver (2) supplies a select signal (SE) to the select electrodes (11). A control driver (3) supplies control signals (DA) to the control electrodes (12). A voltage level generator (5) supplies a plurality of different voltage levels (VBi) to level electrodes (13) of the active matrix display. The active matrix display further comprises select circuits (6) which are arranged to selectively couple the voltage levels (VBi) on the voltage level electrodes (13) to the pixels (10) to supply one of the plurality of different voltage levels (VBi) to a particular one of the pixels (10) in dependence on the select signal (SE) and the control signal (DA) associated with this particular pixel (10). The select signal (SE) indicates whether the particular pixel (10) is selected and the control signal (DA) indicates which one of said plurality of different voltage levels (VBi) has to be supplied to the particular one of the pixels (10) when selected.



PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Published:

— with international search report

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G09G3/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G09G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 762 374 A (MOTOROLA INC) 12 March 1997 (1997-03-12) page 3, column 3, line 3 - column 4, line 43; figures 1,2 page 5, column 7, line 38 - line 49 claims 1,2	1-3,7,8
Y	---	6
Y	US 4 833 464 A (DI SANTO FRANK J ET AL) 23 May 1989 (1989-05-23) cited in the application claims 1,2	6
A	US 6 184 854 B1 (WETTIG ALAN D ET AL) 6 February 2001 (2001-02-06) cited in the application claims 1-3	1,7,8
	--- -/-	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

- *A* document defining the general state of the art which is not considered to be of particular relevance
- *E* earlier document but published on or after the international filing date
- *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O* document referring to an oral disclosure, use, exhibition or other means
- *P* document published prior to the international filing date but later than the priority date claimed

- *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *S* document member of the same patent family

Date of the actual completion of the international search

16 December 2003

Date of mailing of the international search report

22/12/2003

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+31-70) 340-3016

Authorized officer

Wanzeele, R

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US 6 417 825 B1 (IPRI ALFRED C ET AL) 9 July 2002 (2002-07-09) abstract column 5, line 47 -column 6, line 34; figure 2</p> <p>-----</p>	1,7,8

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 0762374	A	12-03-1997	US 5748160 A 05-05-1998
		EP 0762374 A1 12-03-1997	
		JP 9138659 A 27-05-1997	
US 4833464	A	23-05-1989	NONE
US 6184854	B1	06-02-2001	NONE
US 6417825	B1	09-07-2002	WO 0019401 A1 06-04-2000